REMARKS

In the Office Action dated July 8, 2005, claims 15-19 were rejected under 112, second paragraph as being indefinite because of a lack of antecedent basis for certain terms. Each of claims 14 through 17 has been amended to provide proper antecedent basis, and all claims are therefore submitted to be in full compliance with all provisions of 112, second paragraph.

Claims 14, 15, 18, 20, 21 and 24 were rejected under 35 U.S.C. §102(b) as being anticipated by Barni et al. This rejection is respectfully traversed for the following reasons.

The Examiner stated the Barni et al. reference "shows all features of the instant invention," and cited the Abstract, the Summary of the Invention, and column 3. lines 33-37 of the Barni et al. reference. Moreover, the Examiner stated because the phrase "said biological tissue" is indefinite, the Examiner will interpret that phrase to mean any object of interest moving within a patient during an operation.

As originally filed, claim 14 explicitly required that the series of n 2D X-ray projections be acquired from a *patient*, and the intraoperatively acquired series of m 2D X-ray projections also be acquired of the *patient*. Claim 14 now has been amended to stated that the series of n 2D X-ray projections is acquired from biological tissue of a patient.

By contrast, the two sets of image data that are acquired in the Barni et al. patent are comprised of one set of image data of the patient, and another set of image data of a medical instrument. It is not clear whether, because the Examiner considered "said biological tissue" to be an indefinite term, the Examiner felt justified in equating that term with a "medical instrument," however, if the Examiner did, in

fact, adopt such an interpretation, Applicants respectfully submit that however indefinite the Examiner may consider that term to be, a person of ordinary skill would never confuse or equate "biological tissue" with a "medical instrument."

In fact, in the Barni et al. reference the second set of image data that are acquired are specifically state to be different from, and distinct from, human anatomy, at column 4, lines 38-48, thereby allowing a much lower resolution X-ray imaging technique to be utilized. Because of this, the Barni et al. reference teaches at that location that not only are the surgical instrument-containing images acquired with the X-ray tube being gated ON at approximately each 60° interval abound the subject, but also the X-ray tube is operated a significantly lower power setting, namely the lowest possible power which still provides adequate resolution for the particular surgical instrument.

Because of these explicit teachings of the Barni et al. reference, there is no disclosure in that reference to obtain an image of the *patient*, in a second series of images, at a lower projection rate than in the first series of images of the *patient*.

The Barni et al. reference, therefore, does not anticipate claim 14, as originally filed or as amended, because the Barni et al. reference does not disclose all of the elements of claim 14 as arranged and operating in that claim. Moreover, claims 15, 18, 20, 21 and 24 add further structure to the novel combination of claim 14, and thus are not anticipated by the Barni et al. reference for the same reasons discussed above in connection with claim 14.

Although a rejection of those claims as being obvious under 35 U.S.C. §103(a) based on the teachings of Barni et al. was not made, the above discussion should make clear that the Barni et al. reference provides explicit statements that

teach away from the subject matter of claim 14. The Barni et al. reference does not provide a general teaching to obtain two series of images, one a lower projection rate than the other, but teaches obtaining a series of images of patient anatomy at a first projection rate, and then obtaining a series of images of a *medical instrument* not only at a lower projection rate than the first series, but also at a lower power. This is because the lower projection rate and the lower power are adequate for the intended purpose of this second series in the Barni et al. reference, namely to obtain an image of the medical instrument that can then be superimposed on the image data of the patient's anatomy. There is no teaching, suggestion, guidance or motivation in the Barni et al. reference to completely disregard this intended purpose of the second series of images and to use that second series of images for the purpose of obtaining another set of image data of the patient's anatomy. Moreover, because of the explicit statements that the second series of images in the Barni et al. reference should be obtained at as low an X-ray power as possible, even if this second series of images in Barni et al. did encompass patient anatomy, there would be little or no point to superimposing such an extremely weak, low-resolution set of data on the original dataset of the patient's anatomy.

Claims 1, 7-9 and 11 were rejected under 35 U.S.C. §102(e) as being anticipated by Menhardt. (Unless and until Applicants perfect their claim for convention priority by filing a certified translation of the priority document, it seems as if this rejection should have been under 35 U.S.C. §102(b), rather than 35 U.S.C. §102(e). This distinction, however, does not appear to be of significance.) This rejection is respectfully traversed for the following reasons. Applicants believe claim 1 as originally filed made clear that the series of n 2D X-ray projections, and the m

2D X-ray projections, were acquired from the patient at different times, since the m 2D X-ray projections are stated to be acquired intraoperatively, whereas no such requirement is present for the series of n 2D X-ray projections. Nevertheless, claim 1 has been amended to make clear that the intraoperatively acquired m 2D X-ray projections of the patient are acquired after the series of n 2D X-ray projections.

It is these two different datasets, acquired at different times and at different projection rates (the projection rate for obtaining the second image data being lower than the projection rate for obtaining the first set of image data) that are then fused to form a completely new set of image data.

As can be seen from the basic procedural steps in each of Figures 1A and 1B of the Menhardt reference, no combination of such images acquired at different times takes place. In the procedure shown in Figure 1A, the so-called "live images" are all acquired after the injection of X-ray contrast agent, i.e., after the medical procedure has begun. In the embodiment shown in Figure 1A of the Menhardt reference, there are no image data acquired before implementing the medical procedure.

In the embodiment shown in Figure 1B, a mask image is acquired before the injection of the contrast agent, and live images are thereafter acquired, and the mask image is subtracted from the live image. The reconstruction using iterative reconstruction techniques takes place on the image data of the subtraction image. This does not represent a fusing of two different images.

Moreover, the iterative reconstruction techniques involve replacing respective pixels having one logic value with pixels having a different logic value, and do not in any way involve different projection rates for obtaining the image data.

The Menhardt reference, therefore, does not anticipate claim 1, nor any of claims 7-9 or 11 depending therefrom.

Claims 1, 7-9, 11, 13-15, 20-22 and 24 were rejected under 35 U.S.C. §102(e) as being anticipated by Ichihashi. (For the same reason noted above with regard to the Menhardt reference, Applicants question whether this rejection should properly have been made under 35 U.S.C. §102(e), as opposed to 35 U.S.C. §102(b).) This rejection is respectfully traversed for the following reasons.

In the Ichihashi reference, as explained at column 5, line 50 through column 6, line 22, a first set of X-ray images (mask images) is acquired. A second set of X-ray images (required to form subtraction images) is subsequently after administration of a contrast agent. These mask images and after-injection images are subtracted from each other to obtain difference images. The regions of the patient enriched with contrast agent are directly shown in the difference images. As stated at column 6, lines 35-44, only a single 3D image dataset is generated.

As stated at column 6, lines 44-67, it is only individual X-ray images (fluoroscopic images) that are subsequently acquired as "live images" (real time images). These are merely displayed together with the aforementioned 3D image dataset.

If the Examiner considers these real time images to be acquired at a different projection rate from the difference images, it is clear that these different images are merely presented side-by-side, but there is no fusing of the images as required in claim 1. A completely new dataset resulting from the fusion of the datasets acquired at different projection rates is not disclosed or suggested in the Ichihashi reference.

The Ichihashi reference, therefore, does not disclose all of the steps of either of claims 1 or 14 as arranged and operating in those claims, and thus does not anticipate any of those claims, nor of claims 7-9, 11 or 13 depending from claim 1, nor any of claims 15, 20-22 or 24 depending from claim 14.

Claim 10 was rejected under 35 U.S.C. §103(a) as being unpatentable over Menhardt.

The above discussion regarding the rejection of claim 1, the subject matter of which is embodied in claim 10, based on the Menhardt reference is applicable to this rejection of claim 10. for those reasons, Applicants respectfully submit claim 10 would not have been obvious to a person of ordinary skill in the field of medical imaging based on the teachings of the Menhardt reference.

Claims 10 and 23 were rejected under 35 U.S.C. §103(a) as being unpatentable over Ichihashi. The above discussion relating to the rejection of claim 14 based on the Ichihashi reference is relevant to this rejection of claims 10 and 23 as well, which embody the subject matter of claim 14 therein. For those reasons, the subject matter of claims 10 and 23 would not have been obvious to a person of ordinary skill in the field of medical imaging under the provisions of 35 U.S.C. §103(a) based on the teachings of the Ichihashi reference.

Applicants note with appreciation that claims 2-6, 12 and 25 were stated to be allowable if rewritten in independent form, as were claims 16, 17 and 19 if also rewritten to overcome the rejection under 112, second paragraph. In view of Applicants' traversal of the above rejections, however, these claims have been retained in dependent form at this time.

All claims of the application are therefore submitted to be in condition for allowance, and early reconsideration of the application is respectfully requested.

Submitted by,

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